

WHAT IS CLAIMED IS:

1. A microplate liquid handling system comprising:

a main frame body;

5 a dispensing mechanism including a plurality of cylinders extending side by side and in parallel with each other by an even interval to provide a linear cylinder array, each cylinder having a nozzle and a plunger and each dispensing tip being attachable to each nozzle for performing suction and discharge of liquid reagent or specimen through
10 the dispensing tips by way of each plunger, each dispensing tip being detachably connectable to each nozzle;

a moving mechanism supported to the main frame body for moving the dispensing mechanism in X-axis, Y-axis, and Z-axis directions directed perpendicular to each other;

15 a microplate placed in the main frame body and having a plurality of wells arranged in an $n \times m$ in matrix fashion, the plurality of cylinders being provided in a number that is equal to the larger of n and m , and the liquid sucked into each dispensing tip being discharged onto each well
20 through each dispensing tip simultaneously with each other;

a first dispensing tip container capable of containing $n \times m$ dispensing tips in a matrix fashion for permitting the nozzles to be attached with a first dispensing tip array directing in the Y-axis direction, the first dispensing
25 tip container providing a longitudinal direction in paral-

lel with the Y-axis direction;

5 a second dispensing tip container capable of containing $n \times m$ dispensing tips in a matrix fashion for permitting the nozzles to be attached with a second dispensing tip array directing in the X-axis direction, the second dispensing tip container providing a lateral direction in parallel with the X-axis direction;

10 a first reagent vessel storing a reagent to be supplied to the dispensing tips of the cylinder array directed in the Y-axis direction, the first reagent vessel providing a longitudinal direction in parallel with the Y-axis direction; and

15 a second reagent vessel storing a reagent to be supplied to the dispensing tips of the cylinder array directed in the X-axis direction, the second reagent vessel providing a lateral direction in parallel with the X-axis direction.

20 2. The microplate liquid handling system as claimed in claim 1, wherein the first dispensing tip container, the second dispensing tip container, the first reagent vessel and the second reagent vessel are placed side by side in the main frame body and in the vicinity of the microplate.

25 3. The microplate liquid handling system as claimed in claim 1, wherein the dispensing mechanism further comprises a driving unit for moving the plungers up and down.

4. The microplate liquid handling system as claimed in claim 3, wherein the plurality of cylinders have vertical axes extending vertically, and

5 wherein each nozzle is provided at each lower end of the cylinder and has a discharge hole opened vertically downwards, and

10 wherein each plunger is provided at each upper end of the cylinder, suction and discharge of liquid into and from each dispensing tip being effected upon vertical movement of each the plunger.

5. The microplate liquid handling system as claimed in claim 4, wherein the plurality of cylinders are provided in the number of twelve.

15 6. The microplate liquid handling system as claimed in claim 1, further comprising a rotating mechanism that rotates the dispensing mechanism by a predetermined angle about a vertically directed rotation axis for changing a direction of the array of the plurality of cylinders.

20 7. The microplate liquid handling system as claimed in claim 6, wherein the rotation axis is positioned in coincidence with a longitudinal center of the array of the plurality of cylinders.

25 8. The microplate liquid handling system as claimed in claim 6, wherein the dispensing mechanism is detachably provided to the rotating mechanism.

9. The microplate liquid handling system as claimed in claim 2, further comprising a thermomixer provided in the main frame body, the microplate being mountable on the thermomixer for imparting vibration to the microplate to promote stirring of the specimen and reagent in the wells while heating the wells to a predetermined temperature.

10. The microplate liquid handling system as claimed in claim 2, further comprising a cooler provided in the main frame body, the reagent vessel being mountable on the cooler for maintaining the reagent at a predetermined cooling temperature.

11. The microplate liquid handling system as claimed in claim 1, wherein the microplate has a longitudinal side in parallel with the Y-axis, and a lateral side in parallel with the X-axis; and

wherein the dispensing mechanism comprises a first dispensing mechanism having a first cylinder array directing in the Y- axis, and a second dispensing mechanism having a second cylinder array directing in the X-axis, respective numbers of cylinders of the first cylinder array and the second cylinder array being provided in a number that is equal to the larger of n and m.